

CLAIMS

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1 1. A method of making a silicon micromechanical structure,
2 comprising the steps of:

3 forming a lightly doped silicon substrate having a first and
4 second side and having less than $5 \times 10^{19} \text{ cm}^{-3}$ boron therein;

5 placing a p+ layer on the first side of said substrate, said p+ *layer*
6 having a boron content of greater than $7 \times 10^{19} \text{ cm}^{-3}$ and a germanium
7 content of about $1 \times 10^{21} \text{ cm}^{-3}$;

8 forming a mask on the second side for etching a predetermined
9 pattern;

10 etching said second side to said p+ layer; and

11 depositing an insulator on said p+ layer and fabricating an
12 electronic component on said insulator.

1 2. The method of claim 1, wherein said boron content is greater
2 than $1 \times 10^{20} \text{ cm}^{-3}$ and the germanium content is from about 0.5×10^{21}
3 cm^{-3} to about $2.0 \times 10^{21} \text{ cm}^{-3}$.

1 3. The method of claim 1, wherein said micromechanical
2 structure is a pressure sensor.

1 4. The method of claim 3, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 5. The method of claim 1, wherein said micromechanical
2 structure is a cantilevered accelerometer.

1 6. The method of claim 5, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 7. The method of claim 1, wherein said micromechanical
2 structure is a dual web biplane accelerometer formed by forming a
3 said p+ layer on both sides of said substrate, forming a proof mask and
4 flexure etching on both sides of said layer until said etching reaches
5 said p+ layers.

1 8. The method of claim 7, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 9. The method of claim 1, wherein said micromechanical
2 structure includes a dielectrically isolated piezoresistor formed on a
3 top surface of a first wafer, a second wafer is bonded to said first
4 wafer, and said second wafer forms a single crystal piezoresistor.

1 10. A method of making a silicon micromechanical structure,
2 comprising the steps of:
3 forming a lightly doped silicon substrate having a first and
4 second side and having less than $5 \times 10^{19} \text{ cm}^{-3}$ boron therein;
5 placing a p+ layer on the first side of said substrate, said p+
6 having a boron content of greater than $7 \times 10^{19} \text{ cm}^{-3}$ and a germanium
7 content of about $1 \times 10^{21} \text{ cm}^{-3}$;

8 forming a lightly doped layer on said p+ layer to form a buried
9 p+ layer;
10 forming a mask on the second side for etching a predetermined
11 pattern;
12 etching said second side to said buried p+ layer; and
13 depositing an insulator on said lightly doped layer and
14 fabricating an electronic component on said insulator.

1 11. The method of claim 10, wherein said boron content is greater
2 than $1 \times 10^{20} \text{ cm}^{-3}$ and the germanium content is from about 0.5×10^{21}
3 cm^{-3} to about $2.0 \times 10^{21} \text{ cm}^{-3}$.

1 12. The method of claim 10, wherein said micromechanical
2 structure is a pressure sensor.

1 13. The method of claim 12, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 14. The method of claim 10, wherein said micromechanical
2 structure is a cantilevered accelerometer.

1 15. The method of claim 14, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 16. The method of claim 10, wherein said micromechanical
2 structure is a dual web biplane accelerometer formed by forming a

3 said p+ layer on both sides of said substrate, forming a proof mask and
4 flexure etching on both sides of said layer until said etching reaches
5 said p+ layers.

1 17. The method of claim 16, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 18. The method of claim 10, wherein said micromechanical
2 structure includes a dielectrically isolated piezoresistor formed on a
3 top surface of a first wafer, a second wafer is bonded to said first
4 wafer, and said second wafer forms a single crystal piezoresistor.

1 19. A device produced according to the method of claim 1.

1 20. The device of claim 19, wherein said boron content is greater
2 than $1 \times 10^{20} \text{ cm}^{-3}$ and the germanium content is from about 0.5×10^{21}
3 cm^{-3} to about $2.0 \times 10^{21} \text{ cm}^{-3}$.

1 21. The device of claim 19, wherein said micromechanical
2 structure is a pressure sensor.

1 22. The device of claim 21, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 23. The device of claim 19, wherein said micromechanical
2 structure is a cantilevered accelerometer.

1 24. The device of claim 23, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 25. The device of claim 19, wherein said micromechanical
2 structure is a dual web biplane accelerometer formed by forming a
3 said p+ layer on both sides of said substrate, forming a proof mask and
4 flexure etching on both sides of said layer until said etching reaches
5 said p+ layers.

1 26. The device of claim 25, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 27. The device of claim 19, wherein said micromechanical
2 structure includes a dielectrically isolated piezoresistor formed on a
3 top surface of a first wafer, a second wafer is bonded to said first
4 wafer, and said second wafer forms a single crystal piezoresistor.

1 28. A device produced according to the method of claim 10.

1 29. The device of claim 28, wherein said boron content is greater
2 than $1 \times 10^{20} \text{ cm}^{-3}$ and the germanium content is from about 0.5×10^{21}
3 cm^{-3} to about $2.0 \times 10^{21} \text{ cm}^{-3}$.

1 30. The device of claim 28, wherein said micromechanical
2 structure is a pressure sensor.

1 31. The device of claim 30, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 32. The device of claim 28, wherein said micromechanical
2 structure is a cantilevered accelerometer.

1 33. The device of claim 32, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 34. The device of claim 28, wherein said micromechanical
2 structure is a dual web biplane accelerometer formed by forming a
3 said p+ layer on both sides of said substrate, forming a proof mask and
4 flexure etching on both sides of said layer until said etching reaches
5 said p+ layers.

1 35. The device of claim 34, wherein said electronic component is
2 selected from the group consisting of dielectrically isolated
3 piezoresistors and resonant microbeams.

1 36. The device of claim 28, wherein said micromechanical
2 structure includes a dielectrically isolated piezoresistor formed on a
3 top surface of a first wafer, a second wafer is bonded to said first
4 wafer, and said second wafer forms a single crystal piezoresistor.